

destroyed, and travel rendered difficult. Reports from Waterville, Gardiner, Fairfield, and other places on the Kennebec, state that the river was higher on the 1st and 2d than it has been since 1869. The Maine Central Railroad was covered with water at several places. At Somerset Mills a raft of logs worth \$20,000 was broken up and carried to the sea.

Bangor, Me.: on the 29th and 30th of April, and during the first sixteen days of the current month, the water in the Penobscot River and its tributaries was, owing to heavy rains and melting snow in the forests and mountains, at a higher stage than it has been for many years, entailing severe losses on lumbermen, saw-mill owners, and farmers along their banks. At Ellsworth several booms and wing-dams were broken, and large numbers of logs floated out to sea. At Sangerville, Hartford, Linn, and other towns on the river, great damage was done to the manufacturing interests, several woolen and cotton mills being flooded, undermined, or otherwise injured, causing a suspension of operations and large losses. On the 13th the river was reported to have been still at an unusual height, and over its banks from Pamedecook Lake to the sea. The railroad from Bangor to Saint John, New Brunswick, and the country through which it passes, was badly washed, and traffic between Bangor and Vanceborough was suspended from the 1st to 12th. Reports from Danforth, Washington Co., on the 6th stated that the water at that place had reached a height eighteen inches higher than any previous record.

Pittsburg, Pa.: on the afternoon of the 7th a heavy thunder-storm, with rain and hail, passed over this station. Several buildings were struck by lightning and slightly damaged. Along Paint Creek, in Cambria county, a very heavy fall of rain occurred, causing the creek to rise suddenly and overflow the Somerset and Cambria Railroad, and damaging much property in the village of Johnstown. Many thousands of logs and numerous bridges were carried away. At Hooversville more than twenty bridges were washed from their foundations, and the cellars of nearly all dwellings flooded. At Morrillville,

Minersville, Cambria City, and Coopersdale many persons were temporarily rendered homeless. It is estimated that the flood ruined property to the extent of \$150,000.

Lynchburg, Va.: heavy rain fell from 8 p. m. of the 9th until the early morning of the 10th; at 9.10 a. m. it again began falling heavily and continued until 9.25 p. m. The storm did no damage in this vicinity, but along the valley of the Sandy River several mills, dams, and bridges were carried away.

Petersburg, Va.: on the 11th and 12th very heavy rain fell in the eastern part of the state and streams in the lower counties, along the coast, were higher than they had been for years. The abutments of an iron bridge which spans Fountain Creek, on the Petersburg and Weldon Railroad, were washed away and the bridge was carried down the stream. A number of mills and small bridges in several southeastern counties were damaged, as well as many acres of peanut and corn.

Laredo, Tex.: the heavy rains which fell throughout the Rio Grande Valley during the night of the 14-15th caused the Rio Grande River to rise rapidly; from midnight to noon the river rose eight feet. On the 15th the custom-house at Laredo was washed away, and one of the largest ferry boats on the river was sunk.

Gorham, Coos Co., N. H.: on the 14th the Androscoggin River between this place and Umbagog Lake was higher than it has been for several years, the flood having been caused by the melting of the winter snowfall in the lake region. A portion of the streets in Gorham was covered with water to a depth of three feet. No serious damage was reported.

Las Animas, Colo.: although but little rain accompanied the thunder-storms of the 26th, 27th, and 28th in this immediate vicinity, in the surrounding country very heavy rain fell and caused streams to rise rapidly. Washouts occurred on the Atchison, Topeka, and Santa Fé Railroad, both east and west of this place.

## HIGH TIDE.

Cedar Keys, Fla., 26th.

## ATMOSPHERIC ELECTRICITY.

## AURORAS.

During the month no unusual auroral displays occurred; those observed during the nights of the 23-24th to 25-26th, the most extensive seen, were reported from New England westward to Montana and as far south as New Jersey, but cloudiness in the Lake region obscured the displays in that district. These auroras were not of unusual brilliancy and no appreciable influence upon telegraph lines has been reported. From the reports received it appears that the displays were most brilliant in Minnesota and Dakota. At Moorhead, Minn., the aurora appeared in the form of a double arch, with streamers moving from east to west, and similar reports are received from other stations in the extreme northwest.

Auroras were reported during the month as follows:

- 2d.—Pekin, Ill.; Nashua, N. H.; Boston, Mass.; Fort McGinnis, Mont.
- 3d.—Bismarck and Fort Totten, Dak.
- 4th.—Poplar River, Mont.
- 11th.—Pekin, Ill.; Orono, Me.
- 12th.—Morganfield, Ky.; Orono and Eastport, Me.; Mount Washington, N. H.; Northfield, Vt.; Saint Vincent, Minn.
- 13th.—Eastport, Me.
- 14th.—Duluth, Minn.
- 17th.—Cresco, Iowa; Mackinaw City, Mich.; Fort Assinaboine, Mont.
- 18th.—Fort Madison, Iowa; Delavan, Embarras, and La Crosse, Wis.; Grand Haven, Mich.; Bismarck and Fort Totten, Dak.
- 19th.—Bismarck, Dak.; Poplar River, Mont.
- 20th.—Webster, Dak.
- 21st.—Egg Harbor City, N. J.

22d.—Windsor, Ill.; Poplar River, Mont.

23d.—Quakertown and Dyberry, Pa.; Cambridge (aurora suspected) and Blue Hill Observatory, Mass.; Beverly, Clayton, Moorestown, N. J.; Independence, Iowa; North Colebrook, Voluntown, and New Haven, Conn.; Parkston and Fort Totten, Dak.; Berlin Mills, Nashua, and Mount Washington, N. H.; Prairie du Chien, Wis.; Northfield, Vt.; Poplar River, Mont.

24th.—Orono and Bar Harbor, Me.; Independence and Cresco, Iowa; Parkston and Fort Totten, Dak.; Berlin Mills and Mount Washington, N. H.; Northfield, Vt.; Grand Haven, Mackinaw City, and Port Huron, Mich.; Moorhead and Saint Vincent, Minn.; Fort Custer and Poplar River, Mont.

25th.—Newport and Northfield, Vt.; Monticello, Iowa; Windsor, Ill.; Poplar River, Mont.

26th.—Duluth, Minn.

31st.—Northfield, Vt.

## THUNDER-STORMS.

Thunder-storms are reported to have occurred in the various states and territories as follows:

Alabama.—6th, 11th, 13th, 14th, 17th to 19th, 21st, 23d to 26th, 29th, 31st.

Arizona.—18th, 25th to 27th, 29th, 30th.

Arkansas.—2d, 4th, 9th, 10th, 12th, 14th to 17th, 22d to 26th, 28th to 31st.

California.—6th, 14th to 16th, 18th to 20th, 22d, 26th, 29th to 31st.

Colorado.—3d, 13th to 16th, 18th, 21st to 23d, 26th to 28th, 31st.

Connecticut.—6th, 7th, 25th, 26th.

Dakota.—1st, 2d, 7th to 9th, 11th to 14th, 20th to 23d, 25th to 28th.

<i>Delaware.</i> —25th, 28th.	<i>Montana.</i> —19th, 20th, 27th, 30th, 31st.
<i>District of Columbia.</i> —5th to 7th, 24th to 26th.	<i>Nebraska.</i> —6th, 11th to 16th, 20th to 27th.
<i>Florida.</i> —5th to 14th, 18th, 20th to 24th, 26th to 31st.	<i>Nevada.</i> —17th to 19th, 23d, 24th, 30th, 31st.
<i>Georgia.</i> —5th, 8th to 12th, 18th to 21st, 23d to 26th, 30th, 31st.	<i>New Hampshire.</i> —10th, 18th, 25th to 27th.
<i>Idaho.</i> —24th.	<i>New Jersey.</i> —3d, 5th to 8th, 11th, 24th to 29th.
<i>Illinois.</i> —1st to 5th, 9th, 10th, 12th to 17th, 21st to 24th, 29th to 31st.	<i>New Mexico.</i> —15th to 18th, 20th, 25th to 27th.
<i>Indiana.</i> —1st to 6th, 10th to 13th, 17th, 21st to 24th, 30th, 31st.	<i>New York.</i> —1st to 3d, 5th to 8th, 19th, 24th to 28th.
<i>Indian Territory.</i> —9th to 12th, 14th to 16th, 20th to 24th, 26th, 27th.	<i>North Carolina.</i> —6th to 10th, 12th, 13th, 19th to 21st, 23d to 27th, 31st.
<i>Iowa.</i> —1st, 2d, 9th to 15th, 21st, 22d, 26th, 29th.	<i>Ohio.</i> —1st to 13th, 21st to 25th, 30th, 31st.
<i>Kansas.</i> —1st, 10th to 16th, 20th to 28th.	<i>Oregon.</i> —17th, 18th, 22d to 24th.
<i>Kentucky.</i> —1st, 3d to 8th, 10th to 14th, 17th, 22d to 26th, 30th, 31st.	<i>Pennsylvania.</i> —1st to 3d, 5th to 8th, 11th, 21st, 24th to 28th, 30th.
<i>Louisiana.</i> —3d, 8th, 10th to 13th, 15th, 17th to 19th, 23d, 27th to 31st.	<i>South Carolina.</i> —5th to 13th, 18th to 20th, 22d to 26th, 30th, 31st.
<i>Maine.</i> —23d, 26th, 27th.	<i>Tennessee.</i> —2d to 4th, 6th to 10th, 12th, 15th to 26th, 29th to 31st.
<i>Maryland.</i> —3d to 8th, 24th to 26th, 28th.	<i>Texas.</i> —1st to 3d, 8th to 31st.
<i>Massachusetts.</i> —6th to 8th, 22d, 25th to 28th.	<i>Utah.</i> —11th, 18th, 20th.
<i>Michigan.</i> —1st to 3d, 5th, 8th, 9th, 11th, 16th, 17th, 20th to 25th, 29th to 31st.	<i>Vermont.</i> —10th, 25th to 27th, 30th.
<i>Minnesota.</i> —1st, 5th, 19th, 20th, 23d, 28th to 30th.	<i>Virginia.</i> —6th to 10th, 12th, 19th, 20th, 23d to 26th, 28th, 30th.
<i>Mississippi.</i> —19th, 26th, 29th, 30th.	<i>Washington Territory.</i> —7th.
<i>Missouri.</i> —1st to 4th, 10th to 17th, 21st, 22d, 24th to 27th, 29th.	<i>West Virginia.</i> —4th, 6th, 7th, 9th, 12th, 20th, 21st, 23d to 26th, 30th, 31st.
	<i>Wisconsin.</i> —2d, 13th, 14th, 21st to 23d, 29th, 30th.
	<i>Wyoming.</i> —11th, 12th, 15th, 18th, 24th, 27th, 31st.

## OPTICAL PHENOMENA.

## HALOS.

The following may be stated in regard to halos observed during May, 1887:

From the 1st to the 6th solar and lunar halos were quite generally reported from all districts east of the Mississippi, the stations reporting lunar halos being much more numerous than those reporting solar halos. During the greater part of this period the storm described as number ii under "Areas of low barometer" was advancing from the lower Rio Grande valley to northern Illinois, the halos being observed to the east and south of an area of complete cloudiness, and in the region in which cirrus and cirro-stratus clouds were generally observed.

During the period from the 6th to 13th but few solar or lunar halos were reported, and those observed were noted mostly at scattering stations to the west of the Mississippi River and in the Pacific coast districts.

On the 14th solar halos were observed in California, Oregon, and Idaho, and also in Kansas, to the east of an area of complete cloudiness covering portions of Colorado, Kansas, and Indian Territory.

Solar halos were observed on the 15th in California, Nevada, Arizona, Indiana, and New York, and on the 16th at scattering stations in the Lake region. The period from the 17th to 25th was one during which but few halos were seen, and those at scattering stations to the west of the Mississippi.

On the 26th solar halos were reported from the north Pacific coast, and lunar halos from Illinois, Indiana, and Ohio.

Both solar and lunar halos were reported on the 28th from numerous stations in the Mississippi Valley, and on the 29th from the Lake region, Ohio Valley, and south Atlantic states; these were followed on the 29th and 30th by the cloudy and rainy weather which attended the storm described as number x under "Areas of low barometer."

The phases of the moon, Washington mean time, during May, as given in "The American Ephemeris and Nautical Almanac" for 1887, are as follows: New moon, 22d, 5 h. 57.3 m.; first quarter, April 30th, 5 h. 52.1 m.; full moon, 6th, 20 h. 53.3 m.; last quarter, 14th, 3 h. 9.3 m.; perigee, 5th, 1.2 h.; apogee, 17th, 0.9 h.

## MIRAGE.

Fort Stanton, N. Mex.: a mirage was observed at sunset on the 19th; the Sierra Blanco Mountains, lying west of here, were plainly seen outlined in the base of a large cumulus cloud in the southeast.

Mirages were also reported to have been observed at the following places:

Parkston, Dak., 1st, 3d, 20th, 24th, 28th; Webster, Dak., 9th, 18th; Salina, Kans., 23d to 25th; Reidsville, N. C., 20th; Spartanburg, S. C., 15th.

## MISCELLANEOUS PHENOMENA.

## FOREST AND PRAIRIE FIRES.

Owing to the small amount of rainfall in April and May, 1887, over a large part of the country, prairie and forest fires have prevailed to great extent. These fires have caused the destruction of property of immense valuation, especially in the lumber regions of Michigan, where the losses are estimated at millions of dollars.

Heavy losses have also resulted from forest fires in Massachusetts, New York, Pennsylvania, Wisconsin, and Dakota.

Of the reports received concerning the forest and prairie fires of May, 1887, the following are given:

*Dakota.*—Grand Forks, Grand Forks Co., 9th: a fierce prairie fire burned over a considerable area fifteen miles north of this place, endangering the settlements in that region. A large elevator of the Minneapolis and Northwestern Elevator Company was destroyed.

*Minnesota.*—Saint Vincent, 7th: at 11.40 a. m. a gale set in from the south; at the same time extensive prairie fires were